



# Food & Beverage Series

SUCROSE MEASUREMENT IN MOLASSES

Application Note 221LS  
YSI Life Sciences



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# Sucrose Measurement in Molasses



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### INTRODUCTION

Sucrose concentrations in complex matrices such as molasses can be measured directly and quickly using the YSI 2900 Series Biochemistry Analyzer. YSI's unique enzyme technology provides for rapid sucrose measurement. Measurements are virtually unaffected by color, turbidity, density, pH, or the presence of reducing substances.

When a sample is injected into the sample chamber, the sucrose diffuses into the membrane containing invertase, mutarotase, and glucose oxidase. The sucrose is hydrolyzed to  $\alpha$ -D-glucose and fructose. The mutarotase allows for the quick equilibrium of glucose between its  $\alpha$  and  $\beta$  forms. In the presence of glucose oxidase, the  $\beta$ -D-glucose (dextrose) is immediately oxidized to hydrogen peroxide and D-glucono- $\delta$ -lactone. The hydrogen peroxide is detected amperometrically at the platinum electrode surface. The current flow at the electrode is directly proportional to the hydrogen peroxide concentration, and through the series of reactions described above, the hydrogen peroxide concentration is also directly proportional to the sucrose concentration.

Because the membrane contains glucose oxidase, any dextrose in the sample will also be oxidized and produce a signal. For this reason, the sample must be dextrose-free. If dextrose is present in the sample, refer to Application Note 220LS for the Simultaneous Measurement of Dextrose and Sucrose in Molasses. For more information, refer to the Operations Manual.

### I. MATERIALS & SETUP

- A. YSI 2900 Series Biochemistry Analyzer - equipped with a 2703 Sucrose Membrane and 2357 Buffer.
- B. Sucrose standards (5.00 g/L/25.0 g/L).
- C. Connect the 2900 Series instrument to a suitable power source.
- D. Perform the instrument and membrane daily checks described in the Operations Manual.
- E. Volumetric glassware (Class A recommended).

- F. The following instrument setup is recommended.  
Sample size 25  $\mu$ L

#### Probe A Parameters

Chemistry	Sucrose
Unit	g/L
Calibrator	5.00
End Point	30 Sec

#### Autocal Parameters

Temperature	1°C
Time	30 Min
Sample	5 Sam
Cal Shift	2%

### II. METHOD

- A. Weigh up to 5.000 g of molasses to be analyzed.
- B. Transfer the sample to a 100 mL volumetric flask using buffer diluent to rinse and dilute. Fill the flask to the mark with buffer and mix.
- C. Calibrate the 2900 Series instrument with a 5.00 g/L sucrose standard solution.
- D. Check the linearity of the membrane at least once a day by injection of sucrose linearity check solutions (25.00 g/L). Refer to the Operations Manual for specifications.
- E. Assay the sample prepared in B by aspiration into the 2900 Series. The linear range of the system is 0.1 to 25.00 g/L sucrose. If the value reported exceeds this, further dilution is required.
- F. Calibrate frequently as described in the Operations Manual.

### III. CALCULATIONS

To calculate % sucrose, multiply the reported value by the appropriate dilution factor.

Example: 2.001 g of molasses was diluted to 100 mL in a Class A volumetric flask. When assayed, the value reported was 5.89 g/L sucrose.

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% Sucrose: 5.89 g/L x 0.100L /2.001 g	= 0.294 g sucrose/g molasses = 29.4% (w/w)
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## ORDERING INFORMATION

YSI Part Numbers:

- 2900 Biochemistry Analyzer
- 2703 Sucrose Membrane Kit
- 2780 Sucrose Standard Solution (5.00 g/L)
- 2778 Sucrose Standard Solution (25.0 g/L)
- 2357 Buffer Kit
- 2363 Potassium Ferrocyanide Test Solution
- 2392 NaCl Solution (for membrane installation)

### For further information, please contact:

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YSI Life Sciences develops and manufactures scientific instruments, sensors and systems that serve a variety of scientific and industrial markets worldwide. YSI has a long history in the life sciences and bioanalytical markets, most notably with our introduction of the world's first commercial whole blood glucose analyzer in 1975. Today there are over 10,000 YSI instruments installed around the world, trusted in critical situations to provide the most accurate data in the shortest time.

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